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08/360,184	12/20/1994	DONALD B. APPLEBY	4233C3	9348

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EXAMINER
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WHITE, EVERETT NMN

ART UNIT	PAPER NUMBER
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1623

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**GROUP 1600**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 08/360,184  
Filing Date: December 20, 1994  
Appellant(s): APPLEBY ET AL.

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Holly D. Kozlowski  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed March 8, 2005 appealing from the Office action mailed July 12, 2004.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is deficient. 37 CFR 41.37(c)(1)(v) requires the summary of claimed subject matter to include: (1) a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number, and to the drawing, if any, by reference characters and (2) for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters. The brief is deficient because the instant claims do not recite "transesterification reactions that do not employ a solvent to form a homogeneous reaction mix" and the summary does not identify the page and line number of this statement in the specification.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,517,360	VOLPENHEIN	5-1985
3,689,461	BALINT ET AL	9-1972
3,679,368	BALINT ET AL	7-1972
3,567,396	SETZLER	3-1971
4,449,828	MANSOUR	5-1984

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1, 5, 6, 8, 9, 13-15, 23, 27, 28, 30, 43-45, 48, 51, 54, 55 and 62 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Willemse (US Patent No. 4,973,682, already of record) or Volpenhein (US Patent No. 4,517,360, already of record) in view of Willemse (EPO 349059, already of record), Balint et al (US Patent No. 3,689,461, already of record), Balint et al (US Patent No. 3,679,368, already of record), Setzler (US Patent No. 3,567,369, already of record) or Mansour (US Patent Nos. 4,449,828, already of record).

Applicants claim a continuous process for preparing highly esterified polyol fatty acid polyester by interesterifying polyol containing more than four esterifiable hydroxy groups and fatty acid ester of an easily removable alcohol in a heterogeneous reaction mixture wherein (a) a catalyst is used in the reaction mixture at an initial level of from about 0.01 to about 0.5 mole of catalyst per mole of polyol; (b) a soap emulsifier is used in the initial stage of the process at a level of from about 0.001 to about 0.6 mole of soap per mole of polyol; (c) the molar ratio of total ester reactant to each esterifiable hydroxy group of the polyol in the reaction mixture ranges from about 0.9:1 to about 1.2:1; (d) the temperature in the initial stage of the process ranges from about 130°C to about 140°C, and in the final stages of the process ranges from about 80°C to about 120°C; and (e) easily removable alcohol is removed from the reaction mixture as the interesterifying reaction proceeds; wherein the initial stage of the interesterifying reaction is carried out in a continuous manner under conditions of backmixing suitable for maintaining within said reaction mixture a level of lower partial fatty acid esters of said polyol that is sufficient to emulsify said reaction mixture. Additional limitations in the dependent claims include the initial catalyst level being from about 0.01 to 0.1 mole of catalyst per mole of polyol or from about 0.02 to about 0.05 mole of catalyst per mole of polyol; the initial level of soap emulsifier being from about 0.2 to about 0.4 mole per mole of polyol; the soap emulsifier being potassium soap of hydrogenated fatty acid containing from about 10 to about 22 carbon atoms; the molar ratio of the total ester

reactant to the esterifiable hydroxyl group being from about 1:1 to about 1.2:1; the initial stage of the interesterifying reaction being carried out under conditions of backmixing until the average degree of esterification of the polyol is from about 20% to about 70% to provide sufficient lower partial polyol polyester to aid in solubilization of the polyol or under conditions of backmixing until the average degree of esterification of the polyol is from about 35% to about 60%; the process wherein the temperature in the initial stage is from about 132°C to about 135°C and the temperature in the subsequent stages is from about 100°C to about 120°C; the process wherein the final degree of esterification of the polyol reaches at least about 70% or at least 95%; the process wherein the final stages of the reaction are carried out under plug-flow conditions, after the degree of esterification of the polyol has reached at least about 50%; the process being carried out in a series of at least two reaction vessels; or three to about eight reaction vessels; .

The Willemse Patent discloses a process for the synthesis of polyol fatty acid polyesters comprising a two-stage transesterification of polyol to polyester. Willemse discloses a process wherein a substantially solvent-free complete reaction mixture of a polyol, optionally in admixture with fatty acid oligoesters thereof, fatty acid lower-alkylester, a transesterification catalyst, and optionally an emulsifier, is caused to react under transesterification conditions of elevated temperature and reduced pressure, said pressure being controlled such that in an initial stage (1) said polyol is esterified to a degree of conversion within the range of 10 to 50% substantially without leaving non-participating polyol, and in a subsequent final stage (2) the reaction is caused to proceed to a degree of conversion of at least 70%. The Willemse Patent further discloses a molar ratio of fatty acid lower-alkylester:sucrose within the range of from 10:1 to 20:1 (see column 4, lines 39-41) and a molar ratio of catalyst:polyol from 0.05:1 to 1:1 (see column 4, lines 54-56). Willemse also discloses the use of alkali metal soaps having 6-12 carbon atoms (see column 4, line 67 to column 5, line 8). Willemse discloses that both stages of the transesterification reaction can be carried out at a similar temperature, which normally lies within the range of from 100° to 180°C (see column 3, lines 50-52). In view of the difference in pressure regime during the initial and final stage of the reaction, Willemse discloses that it may be of advantage to use a

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reaction system comprising two separate reaction vessels each equipped with pressure control means optimized to the specific reduced pressure regime needed (see column 3, line 62-67). The process by Willemse also involves removal of the lower-alkyl alcohol from the reaction mixture during the esterification reaction. Willemse also suggests that the process can be carried out in a continuous or semi-continuous operation (see column 5, lines 64-68).

Volpenhein discloses a transesterification process for synthesizing polyol fatty acid polyesters comprising the steps (1) heating a mixture of (a) a polyol selected from the group consisting of monosaccharides, disaccharides and sugar alcohols, (b) a fatty acid ester selected from the group consisting of methyl esters, 2-methoxy ethyl esters, benzyl esters and mixtures thereof, (c) an alkali metal fatty acid soap, and (d) a basic catalyst, to a temperature of from about 110° C to about 180° C at a pressure of from about 0.1 mm to about 760 mm of mercury to form a homogenous melt; and (2) subsequently adding to the reaction product of step (1) excess fatty acid ester selected from the group consisting of methyl esters, 2-methoxy ethyl esters, benzyl esters and mixtures thereof (see column 2, lines 40-60). Volpenhein discloses that the heterogeneous mixture used to carry out the process of step 1 generally comprises from about 10% to about 50%, preferably from about 15% to about 30%, by weight of the polyol; from about 40% to about 80%, preferably from about 55% to about 75%, by weight of the fatty acid esters; from about 1% to about 30%, preferably from about 5% to about 20%, by weight of the alkali metal fatty acid soap; and from about 0.05% to about 5%, preferably from about 0.1% to about 0.5%, by weight of the basic catalyst component (see column 5, lines 3-12). The process disclosed by Volpenhein is within the scope of the process set forth in the instant claims. Volpenhein teaches heating the reaction mixture in the initial stages to temperatures ranging from about 110° C to about 180° C (see column 5, lines 33-35), and teaches heating this reaction mixture in the final stages to temperatures of from about 120° C to about 160° C (see column 5, lines 53-57). The temperature range of Volpenhein's initial stage covers the initial stage temperature range claimed by the Applicants and the final stage temperature of 120° C

as disclosed in the Volpenhein reference is within the final stage temperature ranged claimed by the Applicants which is a maximum of 120° C.

The instant claims differ from the Willemse and Volpenhein patents by claiming that the process is carried out under conditions of backmixing suitable for maintaining within said reaction mixture a level of lower partial fatty acid esters of said polyol that is sufficient to emulsify said reaction mixture.

The Balint reference (US 3,689,461) discloses a process for the preparation of linear condensation polyesters from a polycarboxylic acid and a polyol which can be carried out in a continuous or discontinuous process. The diagrammatical drawing of the apparatus used in Figure 1 suggests a process whereby the reaction is carried out under plug flow conditions by feeding the output of the initial stage into a series of at least two continuous stirred tank reactors. Example two of the Balint reference, which refers to Figure 1, describes a process whereby part of the partially esterified material which is produced is returned to the inlet of the circulating pump to be combined with fresh paste appears to be within the scope of the backmixing step claimed in the instant application.

Balint et al (US Patent No. 3,679,368), Setzler US Patent No. 3,567,369) and Mansour (US Patent Nos. 4,449,828) all show that the preparation of products in a continuous operation under conditions of backmixing and plug flow is well known in the art (see the abstract of each reference).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Willemse and Volpenhein's process for preparing polyol fatty acid polyesters by applying the various conditions under which the process is to be carried out as suggested by Balint '461, Balint et al '368, Setzler and Mansour all of which teach carrying out a process in a continuous operation and under conditions of backmixing and plug flow, since such process steps for preparing polyol polyester and such conditions for the operation of a continuous process increases the quality and quantity of the desired product.

#### **(10) Response to Argument**



Appellant's arguments filed in the Appeal Brief have been fully considered but they are not persuasive. On page 9, 2<sup>nd</sup> paragraph to the 1<sup>st</sup> paragraph of page 10 of the Appeal Brief, Appellant argues that while Willemse indicates at column 5, lines 66-68 that in a continuous or semi-continuous operation, the drying chamber and reaction vessel preferable are separate and Appellant indicates no other teaching or suggestion in Willemse relating to a continuous process was found. Appellant also argues that no such teaching or suggestion was found in the Volpenhein reference. Appellant argues that no teaching or suggestion in Willemse and Volpenhein relating to a continuous process carried out under conditions of backmixing was found. Appellant further argues that no teaching or suggestion was found in Willemse and Volpenhein wherein at least a final stage of the interesterifying reaction in a continuous manner under conditions approaching plug-flow conditions, particularly after the degree of esterification of the polyol has reached at least about 50%, as required by claim 62. Appellant argues that the specific exemplary teachings of Willemse and Volpenhein are directed to batch processes. Appellant argument regarding the use of continuous process in the Willemse and Volpenhein is not persuasive since the Willemse does suggest the use of continuous process (see column 5, lines 66-68). Appellant is reminded that, in general, the applicable law is that it does not involve patentable invention to merely claim the operation of an old process on a continuous basis. See, e.g., *In re Lincoln*, 126 F.2d 477, 478 (CCPA 1942) {"Merely operating the old process in a continuous manner is not seen to impart invention in the absence of a showing of unexpected beneficial results."} Accord, *Ex Parte Beeber*, 123 USPQ 221, 223 (Bd. App., 1959). Appellant's arguments regarding conditions under backmixing and conditions approaching plug-flow conditions not found in the Willemse and Volpenhein references is not persuasive since this subject matter was rejected using a combination of other references. In response to Appellant's arguments against the Willemse and Volpenhein references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Appellant argues that the Willemse and Volpenhein references teach away from the temperature parameter required by claim 1 as Willemse discloses raising the temperature in the later stage of the reaction, rather than reducing the temperature as required by claim 1, while Volpenhein does not distinguish between the temperature employed in his reaction steps. This argument is not persuasive since the temperature ranges used in the initial and final stages of the Willemse and Volpenhein references covers at least part of the temperature ranges in the initial and final stages of the instant claims. No significant change to the product as a result of the temperatures used to carry out the instant process has been noted when compared to the product obtained using the process of the prior art. Appellant is reminded that changes in process conditions such as temperature of an old process do not impart patentability unless the recited ranges are critical, i.e., they produce a new and unexpected result. *In re Aller et al.* (CCPA 1955) 220 F.2d 454, 105 USPQ 233.

Appellant argues on page 11, 2<sup>nd</sup> paragraph, that the only teaching in the Volpenhein reference specifically directed to molar ratios of the reactant throughout the process is in Example I wherein the final molar ratio of fatty acid methyl ester to sucrose was 12:1, recognizing that sucrose has 8 esterifiable hydroxy groups, which corresponds to a fatty acid: hydroxyl group ratio of 1.5:1, which is above the range recited in claim 1. However, this argument is not persuasive since Volpenhein in column 5, lines 44-50 discloses using excess ester groups which may be selected as fatty acid methyl groups, to raise the overall ester:polyol mole ratio to be above about 8:1, which corresponds to esterifiable hydroxyl group to polyol mole ratio of 1:1 (recognizing that sucrose has 8 esterifiable hydroxyl groups), which covers the molar ratio of total ester reactant to each esterifiable hydroxyl group disclosed in the claims.

Arguments against the Willemse EP '059 as an improper reference was noted and drop as a reference in the final rejection filed July 12, 2004.

The Balint '461 reference discloses a process for the preparation of linear condensation polyesters from a polycarboxylic acid and a polyol, which can be carried out in a continuous or discontinuous process. The diagrammatical drawing of the apparatus used in Figure 1 suggests a process whereby the reaction is carried out

under plug flow conditions by feeding the output of the initial stage into a series of at least two continuous stirred tank reactors. Example two of the Balint '461 reference, which refers to Figure 1, describes a process whereby part of the partially esterified material, which is produced is returned to the inlet of the circulating pump to be combined with fresh paste, which is within the scope of the backmixing step claimed in the instant application.

The Balint et al '368, Setzler and Mansour references all show that the preparation of products in a continuous operation under conditions of backmixing and plug flow is well known in the art (see the abstract of each reference).

In response to Appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Willemse and Volpenhein's process for preparing polyol fatty acid polyesters by applying the various conditions under which the process is to be carried out as suggested by Balint '461, Balint et al '368, Setzler and Mansour, all of which teach carrying out a process in a continuous operation and under conditions of backmixing and plug flow, since such process steps for preparing polyol polyester and such conditions for the operation of a continuous process increases the quality and quantity of the desired product.

On page 15, section C of the Appeal Brief filed March 8, 2005, Appellant argues that Claims 8, 9 and 28 are independently patentable because of the differences in the amount of soap emulsifier per mole of polyol cited in the Willemse and Volpenhein references. This argument is not persuasive since Willemse discloses amounts of emulsifier in the range from 0.1 to 15%, which covers the amount of soap emulsifier disclosed in the instant claims.

On pages 15 and 16, section D of the Appeal Brief filed March 8, 2005, Appellant argues that Claims 13, 43 and 51 are independently patentable because of the differences in the molar ratio of the total ester reactant to the esterifiable hydroxyl group, which is cited in the instant claims as 1:1 to about 1.2:1. However, this argument is not persuasive since Volpenhein in column 5, lines 44-50 discloses using excess ester groups which may be selected as fatty acid methyl groups, to raise the overall ester:polyol mole ratio to be above about 8:1, which corresponds to esterifiable hydroxyl group to polyol (recognizing that sucrose has 8 esterifiable hydroxyl groups) mole ratio of 1:1, which covers the molar ratio of total ester reactant to each esterifiable hydroxyl group disclosed in the claims.

On page 16, section E of the Appeal Brief filed March 8, 2005, Appellant argues that Claims 14, 15, 28, 54 and 55 are independently patentable because Appellant found no teaching or suggestion in either Willemse or Volpenhein, or any of the secondary references relied upon by the Examiner, which provide any specific description of backmixing conditions for a fatty acid lower alkyl ester-polyol reaction, and particularly found no teaching or suggestion of the backmixing conditions as recited in any of the said claims. This argument is not persuasive since the Willemse reference discloses on page 2, 4<sup>th</sup> paragraph a degree of conversion of 70%. Conditions regarding the backmixing of the reactants are set forth in the Balint et al '461, Balint et al '368, Setzler and Mansour references which were previously discussed.

On page 17, section F of the Appeal Brief filed March 8, 2005, Appellant argues that Claim 30 is independently patentable because of a difference in the temperature used to carry out the process. This argument is not persuasive because, as discussed above, the temperature ranges used in the initial and final stages of the Willemse and Volpenhein references covers at least part of the temperature ranges in the initial and final stages of the instant claims. Appellant is reminded that changes in process conditions such as temperature of an old process do not impart patentability unless the recited ranges are critical, i.e., they produce a new and unexpected result. *In re Aller et al.* (CCPA 1955) 220 F2d 454, 105 USPQ 233.

On page 18, section G of the Appeal Brief filed March 8, 2005, Appellants argue that Claims 48 and 51 are independently patentable because of deficiencies in the prior art of record regarding the final stages of the reaction being carried out under plug-flow conditions, after the degree of esterification of said polyol has reached at least about 50%. This argument is not persuasive for the reasons discussed above regarding plug-flow conditions.


On page 19, section H of the Appeal Brief filed March 8, 2005, Appellants argue that Claims 48 and 51 are independently patentable because of deficiencies in the prior art of carrying out the process in at least two vessels or in three to about eight reaction vessels. This argument is not persuasive since the use of two or more vessels to carry out a process is known in the art.

**(11) Related Proceeding(s) Appendix**

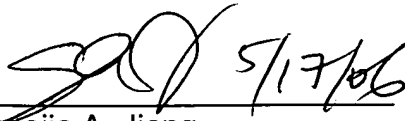
No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.


For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

  
\_\_\_\_\_  
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Examiner  
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